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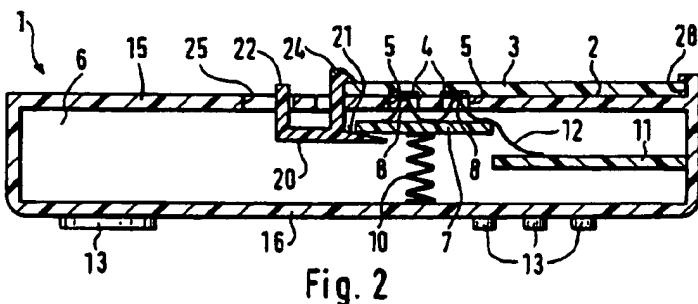
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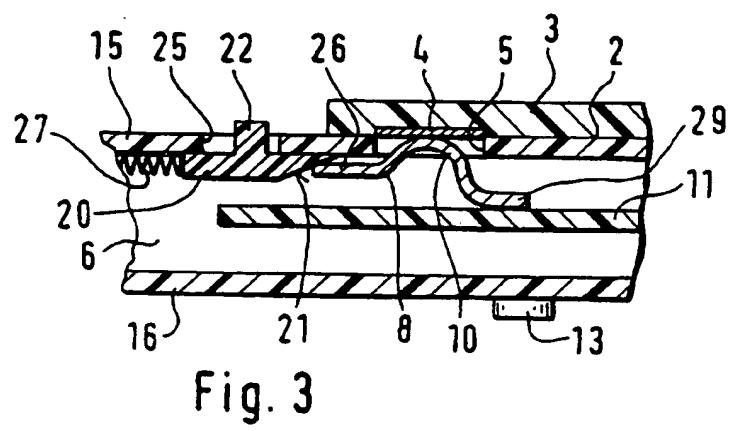
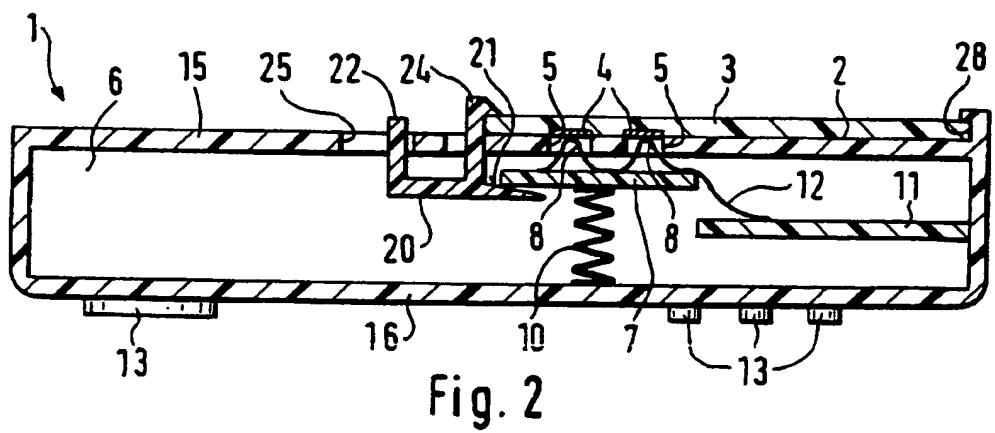
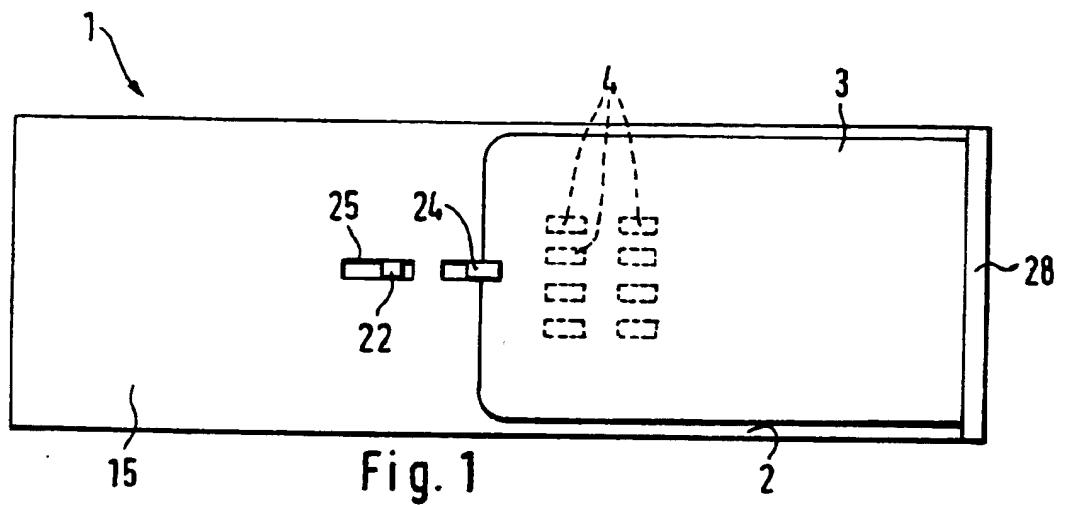
Device for reading data carrier cards

(57) In order to provide protection from dirt and damage for the contact elements (8) for reading a chip card (3), when no card (3) is placed on a bearing surface (2), the contact elements (8) are positioned below the bearing surface (2) and at a distance from it in the interior of the housing (1), so that when a card (3) is placed onto the bearing surface (2) and an adjusting member (20) slid to the right, the distance between the contact elements (8) and the bearing surface (2) is reduced so that the contact elements protrude at least partially through at least one opening (5) and contact the contact surfaces of the card (3).

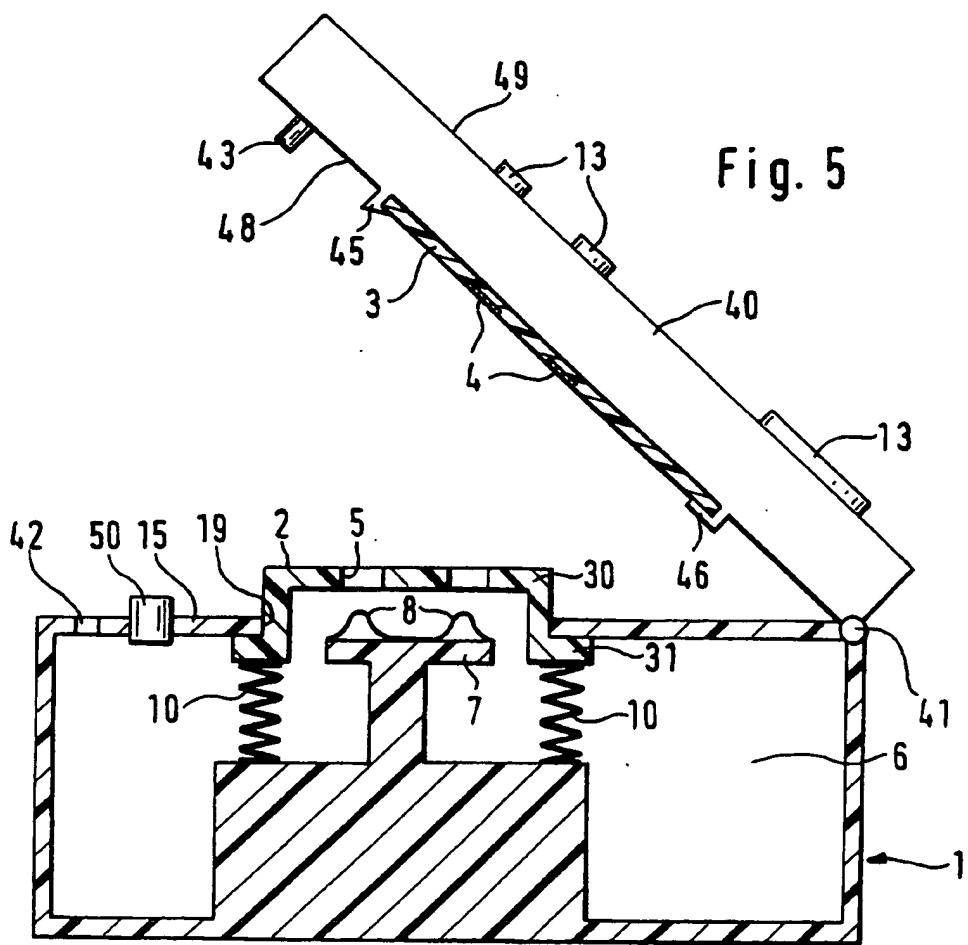
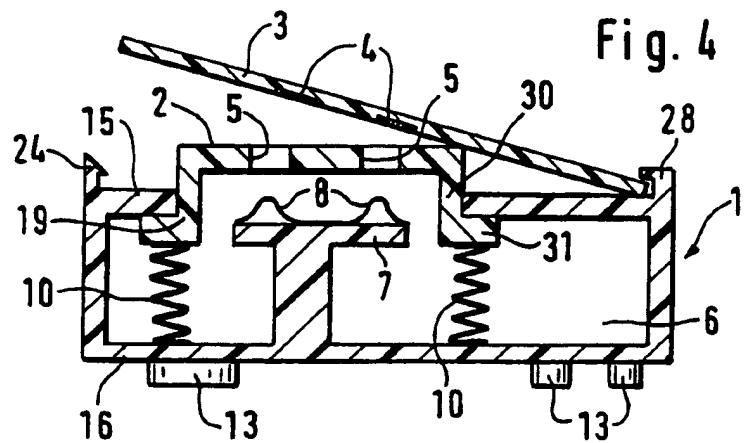


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Device for reading data carrier cards

**State of the art**

The invention relates to a device for reading data carrier cards having the features disclosed in the preamble of claim 1.

Devices for reading data carrier cards with a readable data panel, in particular so-called chip card reading devices, have been known for some time. In the known devices, the chip cards are pushed into an insertion slot protecting the reading contacts of the device. During this process, the chip cards slide over the reading contacts over the entire insertion length, so that the contacts become contaminated with worn particles and the chip cards become unusable with time. In addition, a complex and expensive insertion mechanism is required. Furthermore, simply constructed chip card readers without insertion mechanics are known, for example from DE 195 15 713 A1, in which a chip card is placed onto a bearing surface of the chip card reader. Provided in the bearing surface of this device is a recess, through which the contact sections of a contact mechanism are guided until they reach a chip card resting upon the bearing surface. A disadvantage in this type of chip card reader is that the contact sections of the contact mechanism are only protected when a chip card is resting upon the bearing surface. When the chip card is removed, the contact sections are unprotected and freely accessible. Consequently, it is not possible to rule out accidental damage to the contacts or a contamination and corrosion of the contacts which impairs the reading quality.

### Advantages of the invention

The device according to the invention for reading data carrier cards having the characterising features of claim 1 avoids the disadvantages occurring in the state of the art and with a cost-saving construction offers effective contact protection, which does not require costly insertion mechanics. When the data carrier card is removed, the contact mechanism can be positioned in the device housing at a distance from the bearing surface and in this manner is advantageously protected against damage and contamination in a simple manner. Furthermore, the device according to the invention requires only a few simple components and allows for a particularly space-saving and robust construction of the device, it being unnecessary to adapt the reading device to the thickness of the data carrier card and it being possible to use the reading device for all known data carrier cards, such as standard chip cards or SIM cards, for example.

Advantageous embodiments and further developments of the invention are described in the features of the subclaims. Accordingly, it is particularly simple to arrange the contact mechanism in the housing so that it can be moved towards the bearing surface and, in order to adjust the distance between the bearing surface and the contact mechanism, to provide an adjusting member, which acts upon the contact mechanism, in the housing of the reading device.

It is advantageous if the contact mechanism is supported in spring-loaded fashion against the adjusting member. In an embodiment, it is provided that the spring element is constructed in a simple and economic manner as a spring-elastically deformable section of the contact mechanism.

It is particularly simple to arrange the adjusting member so that it is displaceable in a guide in the bearing surface

and to provide a slide surface on the adjusting member acting upon the contact mechanism. By way of a displacement of the adjusting member, the distance between the contact mechanism and the bearing surface of the data carrier card can then be adjusted in a simple manner. By means of a locking of the adjusting member, the displaceable contact mechanism can be easily fixed in position.

Particularly advantageous is an embodiment of the invention in which the bearing surface is arranged on the housing of the card reading device so as to be displaceable towards the contact mechanism. In this embodiment, the contact mechanism can be economically arranged as a fixed part in the device housing.

In particular it is possible to construct the contact mechanism in the form of contact elements, which are fixedly soldered to a circuit board arranged in the interior of the device, which is particularly cost-effective. In this case, the bearing surface, which is provided with at least one recess for the engagement of the contact elements and is displaceably arranged in the housing, advantageously forms a displaceable shield protecting the contact elements.

The displaceable bearing surface can be advantageously formed by the surface of a cover which is displaceably mounted in a recess in a housing wall and can be lowered against the tensional force of a spring element into the recess. This embodiment can be realised in a particularly simple and economic manner.

In order to hold the data carrier card in position on the bearing surface simple means are advantageously provided, such as grooves and locking noses.

It is also advantageous to provide a housing cover on the housing, which can be pivoted towards the housing of the

reading device and to which the data carrier card can be secured when the housing cover is open. When the housing cover provided with the data carrier card is closed, the distance between the contact mechanism and the bearing surface can then be automatically reduced. This embodiment is particularly easy to handle and offers very good protection of the contacts, which are additionally protected by the housing cover.

Furthermore, an end position switch can be also be provided in the housing interior, which can be actuated in a simple manner by the displaceable contact mechanism, the displaceable bearing surface, the data carrier card or a housing cover and allows for automatic reading of the data carrier card.

#### Drawings

Embodiments of the invention are illustrated in the drawings and will be explained in further detail in the following description. In the drawings:

Fig. 1 is a plan view of a first embodiment of the device according to the invention for reading data carrier cards,  
Fig. 2 is a cross section through the device according to Fig. 1,  
Fig. 3 is a partial view of a second embodiment of the invention,  
Fig. 4 shows a third embodiment of the invention,  
Fig. 5 shows a fourth embodiment of the invention.

#### Description of the embodiments

Fig. 1 is a plan view of the rear side 15 of a device 1 with a reading mechanism for data carrier cards. In the examples shown here, the device is a reading device for chip cards, which are provided with a standardised pattern of contact

areas for transferring information from the chip card to the device. In the example shown in Figs. 1 and 2, the device 1 is constructed as a pivotable device cover of a car radio, which can be pivoted towards the radio housing via hinges, not shown, with the rear wall 15, so that in the closed state only the front side 16 of the device cover is visible. Provided on the front side 16 of the device cover 1 are various operating elements 13 for operating the radio device. Of course, other applications of the device illustrated in Figs. 1 and 2 are possible. Thus, the device shown in Fig. 1 can be a mobile telephone, for example, whose rear side 15 is provided for receiving a chip card. The rear side 15 could also be provided with an additional sealing cover, for example. The reading device can also be used in any other device which requires a reading device for chip cards. The term chip cards includes both standard chip cards according to ISO 7816 and SIM cards. However, the field of application of the reading device is neither restricted to a particular chip card type nor to a prescribed chip card size.

As can be seen from Figs. 1 and 2, the rear wall 15 of the device housing 1 comprises a bearing surface 2 for receiving a chip card 3. The chip card 3 is provided on its side facing the bearing surface 2 with a standardised pattern of eight contact areas 4. Provided beneath the contact areas 4 of the chip card in the bearing surface 2 is a pattern of recesses 5 corresponding to the contact areas. The position of the chip card 3 is aligned by the groove 28 and further guides, not shown, in such a manner that the contact areas 4 lie directly over the recesses 5. The housing 1 encloses a housing interior 6, in which a contact mechanism 7, 8 is displaceably arranged. The movement of the contact mechanism is controlled by guide means, not shown, in such a manner that the contact mechanism can only be moved towards the bearing surface 2 or away from said surface. Furthermore, the contact mechanism comprises a plate-like

contact support 7, on which eight contact elements 8 are arranged. The contact elements 8 are connected via conductor connections 12 to a circuit board 11, on which an electronic evaluating circuit is arranged. The contact support 7 is secured to the housing 1 by means of a spring 10. In the embodiment illustrated here, the spring force is directed in such a manner that the contact support is pulled away from the bearing surface 2 by the spring and towards the front side 16 of the device. An adjusting member 20 displaceably arranged in a further recess 25 in the housing wall 15 comprises a slide surface 21 acting upon the contact support 7. When the chip card 3 is placed onto the device, the following procedure takes place. The chip card 3 is placed onto the bearing surface 2 in a position in which the adjusting member 20 is located at the left-hand edge of the recess 25 in Fig. 2 and is pushed into the groove 28. In this position, the contact support 7 is lowered within the housing interior and lies at a distance from the bearing surface 2, so that the contact elements 8 do not engage through the recesses 5. When the adjusting member 20 is displaced manually to the right by way of the finger 22 projecting above the bearing surface 2, the contact support 7 slides against the tensional force of the spring 10 along the slide surface 21 towards the bearing surface 2, guide means, not shown, preventing lateral slippage of the contact support. In its end position, the adjusting member 20 rests against the right-hand edge of the recess 25. In this position, the elastically resilient locking hook 24 connected to the adjusting member engages around the chip card 3, so that the latter is fixed in position between the groove 28 and the locking hook 24. At the same time, the contact elements 8 of the contact support 7 engage through the recesses 5 and contact the contact areas 4 of the chip card 3. The adjusting member 20 can be locked in its end position by locking means, not shown, such as a catch device, so that the adjusting member 20 is not accidentally pushed back. Furthermore, it is possible to provide the

adjusting member 20 with a snap mechanism, so that it automatically snaps into its end position when the chip card is positioned and forces the contact elements 8 against the chip card. The snap mechanism could also be automatically triggered only when the device cover 1 is pivoted back by an actuating means which is provided on the radio device and acts upon the finger 22.

Fig. 3 shows a further embodiment of the device according to the invention. The basic difference as compared with the embodiment shown in Fig. 2 consists in that the contact elements 8 are fitted via a first end section 29 without additional contact supports directly onto the circuit board 11 and are constructed in the form of elastically resilient contact strips. The contact elements 8 are provided with an elastically resilient central section 10, which is shaped in such a manner that it can extend with parts of its extension through a recess 5 in order to contact a contact area of the chip card. The central section 10 can be constructed, for example, in the form of a semi-circular bend. In this respect, the spring force of the contact elements 8 is directed in such a manner that, in contrast to the example shown in Fig. 2, the latter are pushed towards the bearing surface 2 by the spring tension. The free end 26 of the contact elements 8 rests against a slide surface 21 of an adjusting member 20, which is displaceably arranged in a recess 25 and is forced by the tensional force of a further spring 27 to the right towards the ends 26 of the contact elements, so that the latter slide downwards along the slide surface 21 against their spring-elastic tensional force, so that the sections 10 are lowered and no longer engage through the recesses 5. In this position, the chip card is placed onto the bearing surface 2. Subsequently, the adjusting member 20 is moved via the finger 22 to the left against the spring 27, the end section 26 sliding upwards on the slide surface 21 as a result of the tensional force of the contact elements 8 and the sections 10 of the contact

elements engaging through the recess 5. In particular, it is also possible to construct the adjusting member 20 in such a manner that the chip card 3 strikes against the finger 22 when it is positioned on the bearing surface 2 and automatically pushes said finger backwards. In addition, further securing means, such as lateral grooves or locking means, can be provided in order to lock the chip card in position on the bearing surface.

A particularly simple embodiment is illustrated in Fig. 4. In this embodiment, which requires a particularly small number of components, the contact elements 8 are arranged on a contact support 7, which is connected to the housing 1 of the reading device and does not need to be displaceable per se. In the region of the contact elements, the housing wall 15 lying opposite the contact support 7 comprises a recess 19, in which a displaceably arranged cover 30 is fitted. The cover 30 comprises a collar 31 engaging behind the edge of the recess 19 and is thus secured against sliding out of the recess 19. At the same time, the edge of the recess 19 forms a guide for the movement of the cover. The cover 30 is secured in a resilient manner to the housing 1 via springs 10. As a result of the prestressing of the springs 10, the cover is pushed out of the recess 19 and slides with the cover edges along the inner walling of the recess 19 until the collar 31 strikes the edge of the recess. In this position, the upper side of the cover projects beyond the outside of the housing wall 15 into the chip card receiving space as shown in Fig. 4. The chip card 3 is inserted into the groove 28 and at first lies against the cover edge, as illustrated in Fig. 4. When the chip card 3 is pushed towards the housing wall 15 in this position, the cover 30 is pushed against the tensional force of the springs 10 into the recess 19 or is lowered into the recess. In this respect, the distance between the contact support 7 and the bearing surface 2 forming the upper side of the cover decreases until the contact elements 8 of the contact

support 7 are guided through the recesses 5 in the upper side of the cover and contact the contact areas 4 of the chip card. In this position, the bearing surface 2 lies flush with the upper side of the housing wall 15. An elastic locking finger 24 engages around the chip card edge and secures the card in position. Of course, the contact elements 8 can also be elastically mounted, so that a defined contact pressure of the contact elements against the contact area is produced. This can also be attained by an elastic mounting of the contact support 7 on the housing.

Fig. 5 shows a further embodiment of the invention. As in Fig. 4, the housing 1 is provided with a recess 19 and a cover 30 which is displaceably mounted therein. However, it is equally possible to use the housing with a displaceable contact mechanism as shown in Fig. 2 or Fig. 3. The further development of the example shown in Fig. 5 consists in that a housing cover 40 is provided on the housing 1. This may be the front cover of a car radio housing, for example. The housing cover 40 is pivotably secured to the housing via a hinge 41 and can be pivoted with the rear side 48 towards the bearing surface 2. Operating elements 13 are arranged on the front side of the housing cover 40. The following procedure is observed when the chip card is inserted. With the housing cover 40 open, the chip card is placed onto the then accessible rear side 48 of the housing cover 40 where it is held in position by securing means. In this respect, it is necessary to ensure that the contact areas 4 of the chip card face away from the rear side 48. As shown in Fig. 5, grooves 46 or locking noses 45 can be used to hold the chip card in position. Subsequently, the housing cover is pivoted with the rear side 48 towards the housing wall 15 of the body housing 1. The chip card 3 thereby comes to rest upon the bearing surface 2, which in Fig. 5 is formed by the upper side of the cover 30. During the closure of the housing cover 40, the displaceable cover 30 is lowered into the housing wall 15, so that the contact elements 8 contact

the contact areas 4 of the chip card 3 through the recesses 5, as in the example from Fig. 4. The housing cover 40 can be locked by means of a securing journal 43 in a recess 42. In cases where the pivotable housing cover 40 is used together with the body housing of the housing shown in Fig. 2 or Fig. 3, the adjusting member 22 can also be actuated by means of the securing journal 43, so that the contact elements 8 are automatically moved towards the contact areas 4 of the chip card.

In the embodiment illustrated in Figures 1 to 5, it is also possible to arrange an end position switch 50, only shown in Fig. 5, in the housing interior 6 or on the housing wall 15 provided with the bearing surface 2, which end position switch, in a position in which the contact elements 8 contact the contact areas 4 of the chip card, is actuated by the displaceable contact mechanism or the adjusting member in Fig. 2 or Fig. 3 or by the displaceable protective cover in Fig. 4 or the housing cover in Fig. 5 and effects an automatic reading of the data stored on the chip card.

CLAIMS

1. Device for reading data carrier cards, more particularly chip cards, comprising a housing (1) with a bearing surface (2), against which a data carrier card (3) supplied to the device comes to rest, and a contact mechanism (7, 8), which is arranged in the housing interior (6) on the side of the bearing surface (2) lying opposite the data carrier card (3) and when a data carrier card (3) is positioned on the bearing surface (2) contacts the contact areas (4) of the data carrier card (3) through at least one recess (5) provided in the bearing surface (2), characterised in that, in the absence of a positioned data carrier card (3), the contact mechanism (7, 8) is arranged in protected fashion in the housing interior (6) beneath and at a distance from the bearing surface (2), and when a data carrier card (3) is positioned, the distance between the contact mechanism (7, 8) and the bearing surface (2) can be reduced in such a manner that the contact mechanism (7, 8) engages at least partially through the at least one recess (5) and contacts the contact areas (4) of the data carrier card (3).
2. Device according to claim 1, characterised in that the contact mechanism (7, 8) is arranged in the housing (1) so as to be displaceable towards the bearing surface (2) and in order to adjust the distance between contact mechanism (7, 8) and bearing surface (2) at least one adjusting member (20) acting upon the contact mechanism (7, 8) is provided. (Fig. 2)

3. Device according to claim 2, characterised in that the contact mechanism (7, 8) is forced against the tensional force of at least one spring element (10) towards the contact areas (4) of the data carrier card (3). (Fig. 2)

4. Device according to claim 3, characterised in that at least one spring element (10) is formed by a spring-elastically deformable, bent section of the at least one contact mechanism (8). (Fig. 3)

5. Device according to claim 3 or 4, characterised in that the adjusting member (20) is displaceably arranged in a guide (25) of the bearing surface (2) and comprises a slide surface (21) acting upon the contact mechanism (7, 8).

6. Device according to claim 5, characterised in that the adjusting member (20) adjusting the distance between the contact mechanism (7, 8) and bearing surface (2) can be locked in position.

7. Device according to claim 1, characterised in that the at least one bearing surface (2) is arranged so as to be displaceable against the tensional force of at least one spring element (10) towards the contact mechanism (7, 8). (Fig. 4)

8. Device according to claim 7, characterised in that the bearing surface (2) forms the upper side of at least one cover (30), which is displaceably mounted in a recess (19) in a housing wall (15), projects beyond the housing wall (15) and can be lowered into the recess (19) against the tensional force of the at least one spring element (10) in such a manner that the upper side (2) of the cover (30) lies flush with the housing wall (15).

9. Device according to one of the preceding claims, characterised in that grooves (28), elastically resilient

locking noses (24) or switchable locking means, which engage laterally around data carrier card (3), are provided for securing the data carrier card (3) in position on the bearing surface (2).

10. Device according to one of the preceding claims, characterised in that a housing cover (40) provided with a front side (49) and a rear side (48) is provided on the housing (1), which housing cover can be pivoted with the rear side (48) towards the bearing surface (2), and means (45, 46) are provided on the rear side (48) of the housing cover (40) for securing the data carrier card (3) in position. (Fig. 5)

11. Device according to claim 10, characterised in that the distance between the contact mechanism (7, 8) and bearing surface (2) during the closure of the device cover (40) is directly or indirectly automatically reduced in such a manner that the contact mechanism (7, 8) engages at least partially through the recesses (5), and during the opening of the housing cover (40), the contact mechanism (7, 8) and the bearing surface (2) are automatically spaced apart.

12. Device according to one of the preceding claims, characterised in that the contact mechanism (7, 8) is formed by a contact support (7) with contact elements (8), which are arranged on the contact support (7), are kept insulated from one another and can be guided with a contact section in each case through a respective recess (5) provided in the bearing surface (2).

13. Device according to one of the preceding claims, characterised in that an end position switch (50) is provided, which is actuated in a position in which the contact mechanism (7, 8) contacts the data carrier card (3).

14. Any of the devices for reading data carrier cards substantially as hereinbefore described with reference to the accompanying drawings.



The  
Patent  
Office  
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Application No: GB 9812032.2  
Claims searched: 1 to 14

Examiner: John Donaldson  
Date of search: 23 June 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): G4M(MBA)

Int Cl (Ed.6): G06K 7/00, 7/01, 7/04, 7/06, 17/00

Other: Online:WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	US 4743746 (MURSCHALL), see column 3, line 16 to column 4, line 2	1, 4, 7, 9, 12, 13

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